Claims

1. Process for manufacturing components made of fiber-reinforced thermoplastic materials, where a blank (7) formed of a short, long, and/or endless fiber (6) and a thermoplastic material is first pre-finished, and this blank (7) is brought into the final form of the component in a negative mold, under pressure, in a hot-forming process, characterized in that the blank (7) is first heated to forming temperature in a heating stage, and then pressed into the negative mold (13) by means of extrusion.

2. Process for manufacturing components which are under tensile, bending, and/or torsion stress, made of fiber-reinforced thermoplastic materials, where a blank (7) formed with a fiber proportion of more than 50 volume-% and with at least predominant use of endless fibers and a thermoplastic material is first pre-finished, and this blank is brought into the final form of the component in a negative mold, under pressure, in a hot-forming process, characterized in that the blank (7) is first heated to forming temperature in a heating stage, and then pressed into the negative mold (13) by means of extrusion.

3. Process according to Claim 1 ~~or 2~~, characterized in that the blank (7) is pre-finished as rod material and is cut to the lengths required for the final component before the hot-forming process.

4. Process according to Claim 1 ~~to 2~~, characterized in that endless fibers (6) with a length that corresponds at least to the length of the blank for the final component are used.

5. Process according to ~~one of Claims 1 to 4,~~ Claim 1 characterized in that a blank (7) composed of layers with different fiber orientation in its lengthwise direction is formed.

6. Process according to ~~one of Claims 1 to 4,~~ Claim 1 characterized in that a blank (7) is formed from more than one polymer laminate, e.g. with several layers with a different matrix material and a

different arrangement and/or different volume-% proportion and/or different fiber material and/or different lengths of the fibers.

7. Process according to ~~one of Claims 1 to 6,~~ characterized in that the blank (7) is formed into the final component by means of a push-pull extrusion process.

8. Process according to ~~one of Claims 1 to 7,~~ characterized in that the blank (7) is heated to a forming temperature of 350-450 °C, for example, in a heating stage, and then pressed into the negative mold (13), where cooling below the glass transition temperature of the thermoplastic material, e.g. 143 °C, takes place during a post-pressure phase.

9. Process according to ~~one of the preceding Claims,~~ characterized in that during the hot-forming process, carbon or graphite is used as a release agent.

10. Process according to ~~one of the preceding Claims,~~ characterized in that a blank (7) made of PAEK (polyaryl ether ketones) reinforced with carbon fibers (6) is processed.

11. Process according to ~~one of Claims 1 to 10,~~ characterized in that at least part of the endless fibers (6) run parallel to the axis of the blank (7).

12. Process according to ~~one of Claims 1 to 11,~~ characterized in that at least a portion of the fibers (6) have an orientation from 0 to 90° in the blank (7).

13. Process according to ~~one of Claims 1 to 12,~~ characterized in that the fibers (6) have a length of more than 3 mm.

14. Process according to ~~one of Claims 1 to 13,~~ characterized in that the fibers are surrounded by matrix material, covering the surface, during extrusion.

15. Process according to ~~one of Claims 1 to 14~~ claim 1, characterized in that the pressing temperature and the pressing speed are adjusted as a variable to change the position and the alignment of the fibers in the finished component.

16. Process according to ~~one of Claims 1 to 15~~ claim 1, characterized in that the components receive an additional surface seal during the hot-forming process.

17. Component made of fiber-reinforced thermoplastic materials, manufactured by a processes according to ~~at least one of Claims 1 to 16~~ claim 1, characterized by a progression of the fibers pre-determined in adaptation to the structure and the use of the component, to achieve regions with locally pre-determined rigidity and strength.

18. Component according to Claim 16, characterized in that this component is structured as a connection element with an engagement end for a tool and a threaded shaft (5), and that the rigidity of the connection element varies from the engagement end to the free end, by means of different fiber orientation.

19. Component according to Claim 17 ~~or 18~~, characterized in that the fibers (6) run at least approximately parallel to the center axis of the component, from the engagement end over the thread turns (4) which immediately follow it, while the fibers (6) in the remaining threaded section follow the thread contour close to the surface, in the axis direction of the component, while an increasingly random distribution of the fiber orientation is provided in the core region of this section.

20. Component according to ~~Claims 18 and 19~~ claim 18, characterized in that the rigidity of the component decreases, in steps or continuously, by means of different fiber orientation from the engagement end towards the free end.

21. Component according to ~~one of Claims 16 to 20~~ claim 16, characterized in that at least one dead-end hole or one through opening, for

example for inserting a turning tool or for passing through means of attachment, is provided in the component.

22. Component according to Claim 21, characterized in that the dead-end hole or the through opening is molded in during manufacturing of the component.

claim 17

23. Component according to ~~one of Claims 17 to 22~~, characterized in that the component is structured as a corticalis screw or spongiosa screw which is compatible in structure, for medical use.

24. Component according to Claim 17, characterized in that it is formed as a strip-shaped or plate-shaped mounting part (18) with one or more through openings (14) and/or segments projecting beyond the length or side delimitations, where the rigidity and strength is pre-determined over its entire length and/or width and/or diameter.

claim 17

25. Component according to ~~Claims 17 to 24~~, characterized in that the component, structured as a mounting part (18), has the same strength and rigidity in the region of through openings (14) and/or projecting segments as in other regions of the component, by means of a denser arrangement of fibers (6) in these regions, which are usually weakened.

claim 17

26. Component according to ~~Claims 17, 24 or 25~~, characterized in that the component is structured as an osteosynthesis plate, for example for use with a corticalis screw or a spongiosa screw.

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